WHAT IS CLAIMED IS:

1. An imaging system, comprising:

laser means for generating a pulse beam substantially uniform in intensity to illuminate a thin slice of said turbid medium;

a streak tube, having a wide but usable cathode, for generating a two-dimensional signal;

a field-limiting slit disposed in front of said cathode for rejecting multiply reflected light;

optical means disposed in front of said field-limiting slit for imaging reflected portion of said pulse beam on said field-limiting slit;

two-dimensional detector means operatively connected to said streak tube for detecting said two-dimensional signal; and

means for generating a volume display of said medium utilizing all, or substantially all, of reflected portion of said pulse beam.

2. The imaging system claimed in claim 1, wherein said two-dimensional signal consists of a temporal variation of said reflected portion in one dimension and a lateral position of said reflected portion over said field-limiting slit in another dimension.

3. The imaging system claimed in claim 1, wherein said optical means disposed in front of said field-limiting slit for imaging reflected portion of said pulse beam on said field-limiting slit further comprises:

large aperture optical means for maximizing the collection of reflected portions during weak returns and for imaging said reflected portions on said field-limiting slit.

4. The imaging system claimed in claim 3, wherein said cathode is of a size sufficiently large enough to encompass said image from said optical means.

5. The imaging system claimed in claim 1 or 4, further comprising:

means disposed between said field-limiting slit and said cathode for reimaging image from said field-limiting slit onto said cathode.

6. The imaging system claimed in claim 1, wherein said means for generating a volume display of said medium utilizing all, or substantially all, of reflected portion of said pulse beam further comprises:

means for illuminating adjacent sections of said medium; and

means for combining said illuminated adjacent sections to provide said volume display.

7. The imaging system claimed in claim 6, wherein said means for illuminating adjacent sections of said medium further comprises:

means for using vehicle motion to provide scanning of said pulse beam over said medium.

8. The imaging system claimed in claim 7, wherein said means for illuminating adjacent sections of said medium further comprises generating a sequence of vertical planes normal to direction of vehicle motion; and

wherein said volume display shows a scan through a volume of said medium.

9. The imaging system claimed in claim 1, wherein said laser means for generating a pulse beam substantially uniform in intensity to illuminate a thin slice of said turbid medium further comprises:

a diamond arrangement mirror beam invertor that uses the gaussian beam shape properties of said pulse beam to enhance outer portions of said pulse beam.

10. A method for detecting a target in a turbid medium, comprising:

generating a pulse beam substantially uniform in intensity and illuminating a thin slice of said turbid medium utilizing said pulse beam;

generating a two-dimensional signal with a streak tube having a cathode;

rejecting multiply reflected light utilizing a field-limiting slit disposed in front of said cathode;

imaging reflected portion of said pulse beam on said field-limiting slit utilizing a light collecting optic disposed in front of said field-limiting slit;

detecting said two-dimensional signal generated by said streak tube utilizing a two-dimensional detector operatively connected to said streak tube; and

generating a volume display of said medium utilizing all, or substantially all, of reflected portion of said pulse beam.

11. The method claimed in claim 10, wherein said two-dimensional signal consists of a temporal variation of said reflected portion in one dimension and a lateral position of said reflected portion over said field-limiting slit in another dimension.

12. The method claimed in claim 10, wherein said light collecting optic has a large aperture for maximizing the collection of reflected portions during weak returns and for imaging said reflected portions on said field-limiting slit.

13. The method claimed in claim 12, wherein said cathode is of a size sufficiently large enough to encompass said image from said light collecting optic.

14. The method claimed in claim 10 or 13, further comprising:

reimaging image from said field-limiting slit onto said cathode.

15. The method claimed in claim 10, wherein said step of generating a volume display of said medium utilizing all, or substantially all, of reflected portion of said pulse beam further comprises the steps of:

illuminating adjacent sections of said medium using said pulsed laser; and

combining said illuminated adjacent sections to provide said volume display.

16. The method claimed in claim 15, wherein said step of illuminating adjacent sections of said medium using said pulsed laser further comprises the step of:

using vehicle motion to provide scanning of said pulse beam over said medium.

17. The method claimed in claim 16, wherein said volume display shows a scan through a volume of said medium and wherein said step of illuminating adjacent sections of said medium using said pulsed laser further comprises the step of:

generating a sequence of vertical planes normal to direction of vehicle motion.

18. The method claimed in claim 10, wherein said step of generating a pulse beam substantially uniform in intensity with a pulsed laser to illuminate a thin slice of said turbid medium further comprises the step of:

utilizing a diamond arrangement mirror beam invertor that uses the gaussian beam shape properties of said pulse beam to enhance outer portions of said pulse beam.

19. A system for detecting a target in a turbid medium, comprising:

source means for generating a series of narrow, fan-shaped, pulse beams substantially uniform in intensity to illuminate sections of said turbid medium;

a streak tube comprising:

a very wide and narrow photocathode for collecting the maximum amount of reflected portions of said pulse beam and for converting said reflected portions to photoelectrons;

a pair of deflection electrodes for generating a deflection electric field, said deflection electrodes being adapted to deflect said photoelectrons emitted from said photocathode; and

a phosphor layer for receiving said deflected photoelectrons and converting said deflected photoelectrons to photons; and

means for applying a varying voltage to said deflection electrodes to cause said photoelectrons from said photocathode to move rapidly across said phosphor layer, thus converting a temporal variation in the input signal into a two-dimensional signal utilizing all, or substantially all, of reflected portions at said phosphor layer;

detector means operatively connected to said phosphor layer for detecting said two-dimensional signal; and

a field-limiting slit for removing multiply scattered light;

optical means for collecting and imaging reflected portions on said field-limiting slit; and

means for generating a volume display of

said turbid medium in depth utilizing all, or substantially all, of reflected portion of said pulse beam.

20. The imaging system claimed in claim 19, wherein said two-dimensional signal consists of a temporal variation of said reflected portion in one dimension and a lateral position of said reflected portion over said field-limiting slit in another direction.

21. The imaging system claimed in claim 19, wherein said means for generating a volume display of said turbid medium in depth utilizing all, or substantially all, of reflected portion of said pulse beam further comprises:

means for using motion of a vehicle to provide scan of said pulse beams, wherein said system is carried by said vehicle adapted for movement over said target and wherein said system is moved normal to longitudinal axis of said pulse beam to illuminate adjacent sections of said turbid medium; and

combining said sections to provide a volume display of said turbid medium.

22. The imaging system claimed in claim 21, wherein the plane of said pulse beam projected downward is normal to the direction of vehicle motion.

23. The imaging system claimed in claim 19, wherein said source means for generating a series of narrow, fan-shaped, pulse beams substantially uniform in intensity to illuminate sections of said turbid medium further comprises:

a diamond arrangement mirror beam invertor that uses the gaussian beam shape properties of said pulse beam to enhance said outer portions of said pulse beam.

24. The imaging system claimed in claim 19, wherein said source means further comprises:

a Q-switched laser that can produce pulse widths of the order of 5 to 15 nanoseconds.

25. The imaging system claimed in claim 19, further comprising:

filtering means for passing the wavelength of said source means and rejecting all other wavelengths.

26. The imaging system claimed in claim 25, wherein said filtering means are narrow band interference filters.

27. The imaging system claimed in claim 19, wherein said streak tube further comprises:

a microchannel plate intensifier for increasing the gain of said photoelectrons before being converted to photons by said phosphor layer.

28. The imaging system claimed in claim 19, further comprising:

a second photocathode for converting photons emitted from said phosphor to photoelectrons;

a microchannel plate intensifier for increasing the gain of photoelectrons emitted from said second photocathode; and

a second phosphor layer for converting photoelectrons emitted from said microchannel plate intensifier to photons, wherein said second phosphor is coupled to said detector means.

29. The imaging system claimed in claim 19, wherein said means for applying a varying voltage to said deflection electrodes further comprises:

a voltage source for providing a linearly increasing voltage to be applied to said deflection electrodes;

a variable delay unit for issuing a delayed pulse to initiate the action of said voltage source; and;

a timing unit for measuring the pulse beam return time and initiating said variable delay.

30. The imaging system claimed in claim 19, wherein said detector means is a detector array.

31. The imaging system claimed in claim 19, further comprising:

display means for viewing image from said detector means.

32. The imaging system claimed in claim 31, further comprising:

enhancement means for enhancing said image prior to display.

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